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(54) Title of the Invention

URETHANE REINFORCEMENT METHOD FOR AUTOMOBILES

(21) Application No.: 62[1987]-67,309  
(22) Application Date: March 20, 1987  
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S P E C I F I C A T I O N

1. Title of the Invention

URETHANE REINFORCEMENT METHOD FOR AUTOMOBILES

2. Scope of the Patent Claim(s)

Urethane reinforcement method for automobiles, characterized in that, in packing foam urethane for reinforcement in a prescribed area of a closed-section cylindrical member which forms the framework of the body of an automobile a balloon-like member is first inserted in a deflated condition via a working hole opened in said cylindrical member; said balloon-like member is then inflated, brought into close contact with the inner wall of said cylindrical member, and set at a section corresponding to the edge of the foam urethane in a packed condition; and foam urethane is then injected and packed in the above-mentioned prescribed area.

### 3. Detailed Description of the Invention

#### Area of Industrial Application

The present invention pertains to a urethane reinforcement method for automobiles.

#### Prior Art

Generally, foam urethane is packed in a prescribed area with a view to improving mainly strength in a closed-section cylindrical member such as a pillar which forms the framework of the body of an automobile (for example, refer to Japanese Patent Kokai No. 48[1973]-2,631). In this case, a partition board is placed in the cylindrical member, so that the foam urethane will only be packed in the prescribed area.

#### Problems to be Solved by the Invention

However, this prior art entailed problems such as increasing the weight as well as the cost, due to the placing of the partition board in the cylindrical member; there was also the danger that the foam urethane would leak

outside the prescribed area; and, moreover, the strength of the cylindrical member was decreased because of the need for a large working hole.

The present invention was developed with attention to such problems of the prior art, and is aimed at providing a urethane reinforcement method for automobiles, which has been developed to promote cost cutting and weight reduction, and at the same time to prevent the foam urethane from leaking outside the prescribed area, to prevent stress concentration, and to increase the strength of the cylindrical member.

#### An Approach to Solving the Problems

To achieve these objectives, the present invention is arranged as follows: in packing foam urethane for reinforcement in a prescribed area of a closed-section cylindrical member which forms the framework of the body of an automobile, a balloon-like member is first inserted in a deflated condition via a working hole opened in said cylindrical member, then said balloon-like member is inflated, brought into close contact with the inner wall of said cylindrical member, and set at a section corresponding to the edge of the foam urethane in a packed condition, then foam urethane is injected and packed in the above-mentioned prescribed area.

#### Action

Because the shape of the end of the foam urethane is hemispherical, there is no sudden strength change in the closed-section cylindrical member. Furthermore, the balloon-like member adheres completely to the inner wall of the cylindrical member and does not leak foam urethane outside the prescribed area. Moreover, the working hole can be small enough to just insert the deflated balloon-like member.

### Actual Example

One actual example of the present invention will be described below with reference to the figures.

In Figures 1 and 2, 1 is the body of an automobile, and 2 is a center pillar which is a closed-section cylindrical member which forms the framework of the body of an automobile 1, formed of a center pillar outer portion 2a and a center pillar inner portion 2b. 3 is an upper hinge place fixed in the center pillar 2. A working hole 4 is opened in the center pillar inner portion 2b of the aforesaid center pillar 2; in packing foam urethane for reinforcement in a prescribed area of the center pillar 2, the main body 5a of a balloon-like member 5, for example a rubber balloon, is first inserted in a deflated condition via the working hole 4, then air 6 is blown in from an air injection hole 5b protruding outside, in order to inflate said balloon-like member 5, and to bring it into close contact with the inner wall of the center pillar 2. In this way, the balloon-like member 5 is set at a section corresponding to the edge of foam urethane in a packed condition in the center pillar 2. Thereafter, foam urethane 7 is injected from an inlet (not shown) and packed in a prescribed area of the balloon-like member 5 [probably a mistake for "center pillar 2" -- Tr. Ed.]. In this case, foam urethane 7 is restrained by the balloon-like member 5 and packed only in the prescribed area. After the foam urethane 7 is packed, the balloon-like member 5 is deflated again by removing the air, taken out of the working hole 4, and kept for reuse.

According to this method of the present invention, cost cutting and weight reduction can be promoted, because the balloon-like member 5 can be used repeatedly by taking it out of the center pillar 2, which is a cylindrical member, after being used as a partition member. Furthermore, there is no

sudden change in the strength of the center pillar 2 and stress concentration can be prevented, because the shape of the end of the foam urethane 7 is hemispherical. Moreover, foam urethane 7 does not leak outside the prescribed area and thus there is no waste, because the balloon-like member 5 adheres completely to the inner wall of the center pillar 2. Besides, the strength of the center pillar 2, which is a cylindrical member, increases, because the working hole 4 can be small enough to just insert the balloon-like member 5.

#### Effect

As described above, the present invention is effective in preventing stress concentration in the cylindrical member which forms the framework of the automobile body and in being capable of increasing its strength as well as preventing foam urethane from leaking outside the prescribed area, together with promoting cost cutting and weight reduction.

#### 4. Brief Description of the Figures

Figure 1 is a sectional illustration along line I-I of Figure 2, which shows one actual example of the present invention. Figure 2 is a side view of the body of an automobile.

(1) automobile body; (2) center pillar (closed-section cylindrical member); (4) working hole; (5) balloon-like member; and (7) foam urethane.

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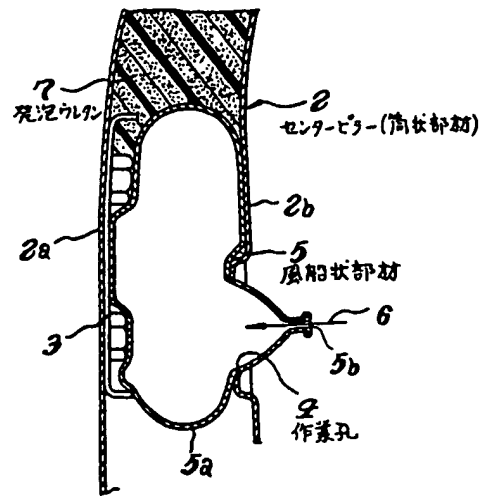


Figure 1. KEY: (2) center pillar (cylindrical member); (4) working hole; (5) balloon-like member; and (7) foam urethane.

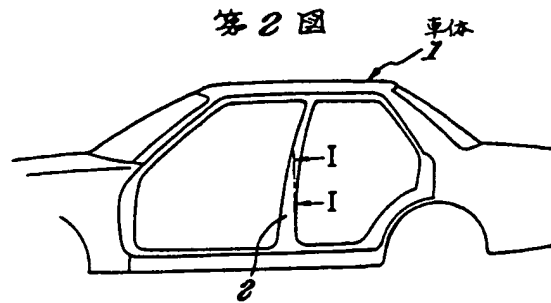


Figure 2. KEY: (1) automobile body.

## ⑫ 公開特許公報(A)

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⑭ 公開 昭和63年(1988)9月28日

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⑮ 発明の名称 自動車のウレタン補強工法

⑯ 特 願 昭62-67309

⑰ 出 願 昭62(1987)3月20日

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## 明 細 書

## 1. 発明の名称

自動車のウレタン補強工法

## 2. 特許請求の範囲

車体の骨格をなす閉断面筒状部材の所定部分内に補強用発泡ウレタンを充填するに際し、先ず前記筒状部材に開設した作業孔から風船状部材をしぼんだ状態で挿入し、その後前記風船状部材を膨脹させ前記筒状部材の内壁に密着させて充填状態における発泡ウレタンの端部相当部にセットし、次に上記所定部分内に発泡ウレタンを注入充填したことを特徴とする自動車のウレタン補強工法。

## 3. 発明の詳細な説明

(産業上の利用分野)

本発明は自動車のウレタン補強工法に関するものである。

(従来技術)

一般に、自動車の車体の骨格をなす例えばピラ-等の閉断面筒状部材に主として強度を向上する目的で所定部分内に発泡ウレタンを充填すること

が行われている。例えば、特開昭48-2631号公報参照) この場合、所定部分にのみ発泡ウレタンを充填するため、筒状部材内に仕切板等を設定している。

(発明が解決しようとする問題点)

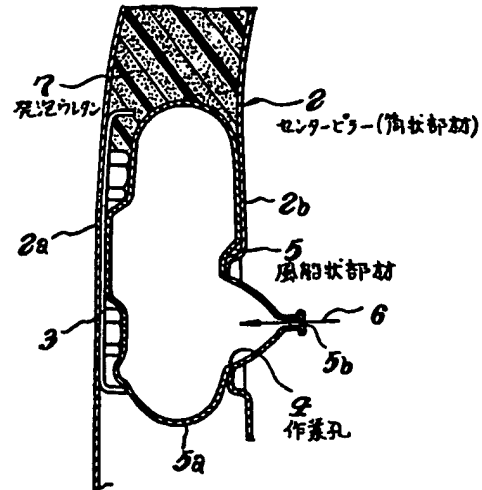
しかしながら、このような従来技術にあっては、筒状部材内に仕切板等を設定するため、原価が高くなるとともに、重量も大きくなり、また発泡ウレタンが所定部分外に洩れる恐れもあり、しかも大きな作業穴も必要で筒状部材の強度を低下させるという問題点があった。

本発明はこのような従来の問題点に着目してなされたもので、原価の低減と重量の軽減を図るとともに、発泡ウレタンの所定部分外への洩れを防止し、併せて筒状部材の応力集中を防ぎかつ強度を増大するようにした自動車のウレタン補強工法を提供することを目的とする。

(問題点を解決するための手段)

本発明はかかる目的を達成するため、車体の骨格をなす閉断面筒状部材の所定部分内に補強用発

第1図



第2図

